

इंटरनेट

मानक

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“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

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“Step Out From the Old to the New”

IS 12213 (1987): Code for mechanical vibrating screens [MED
17: Chemical Engineering Plants and Related Equipment]



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“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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*Indian Standard***CODE FOR MECHANICAL VIBRATING SCREENS**

1. Scope — Covers mechanical vibrating screens used for screening the material of various grain sizes.

1.1 The standard screen sizes shall be in accordance with IS : 2405-1980 'Specification for industrial sieves'.

2. Nomenclature — For the purpose of this standard, the various components of mechanical vibrating screens shall be designated as in Fig. 1 and 2.

3. Classification

3.1 Application of Machine — A machine for screening, grading, dewaterizing or scalping the material of various sizes. Vibrating screen may be with dust cover for air pollution control environment.

3.2 Types of Vibration

3.2.1 Circular motion vibration — Eccentric mass and/or eccentric shaft gives centrifugal force for vibration of basket/live frame. Concentric shaft with eccentric weights may also be used.

3.2.2 Straight line motion vibration — Eccentric masses are set on two rotating shafts rotating in counter direction to give straight line vibration to the basket/live frame.

3.2.3 Gyratory motion vibration — Eccentric mass attached to vertical shaft gives centrifugal force for horizontal vibratory motion of basket/live frame. This type of motion shall be considered in special cases.

3.3 Type of Enclosure

3.3.1 Vibrating screen with dust cover — The vibrating screens are to be provided with dust cover, in case dust containment or extraction is envisaged. Vent hood may be provided to connect with dust collection system.

3.3.2 Vibrating screen without dust cover — These vibrating screens are without dust cover. The screen is fitted with open basket/live frame where dust generation is not envisaged.

3.4 Number of Decks

3.4.1 Single deck — The screens are provided with one deck vibrating basket/live frame.

3.4.2 Double deck — The screens are provided with two decks.

3.4.3 Triple deck — The screens are provided with three decks.

3.4.4 Four deck — The screens are provided with four decks.

3.5 Type of Cloth Fixing

3.5.1 Longitudinal tensioning arrangement — Where cloth is fitted with vibrating screen, fixing and tensioning is done at the end of the screen.

3.5.2 Side tensioning arrangement — Screens are provided with cross tensioning arrangement. Fixing and tensioning is done from the side of screen basket/live frame.

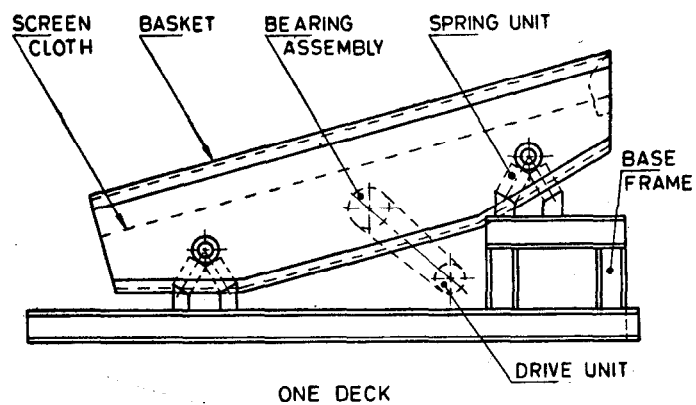
3.6 Type of Screening

3.6.1 Vibrating screen — The screens are used for gradation of sizing purpose. The openings of deck are fine, medium and large.

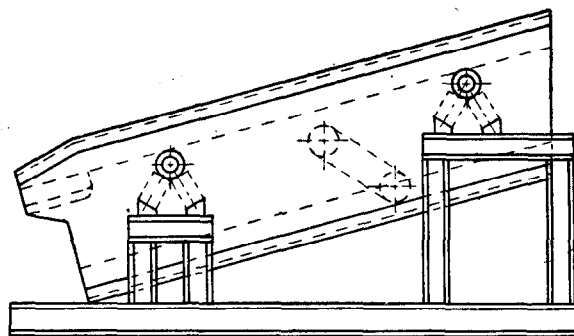
Adopted 16 October 1987

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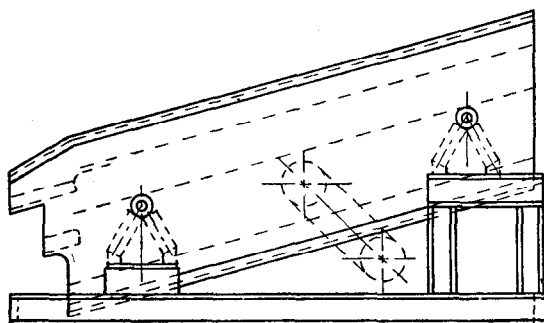
Gr 3



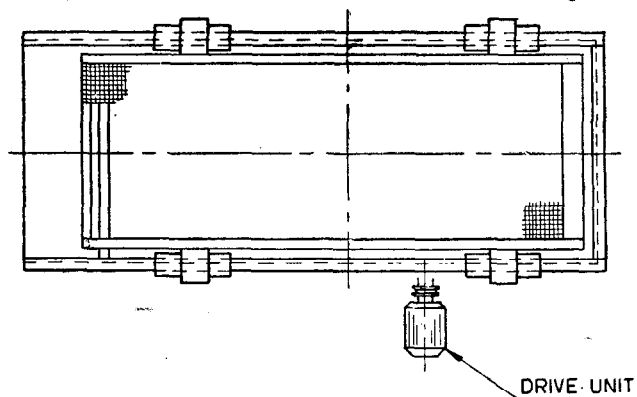
ONE DECK



TWO DECK



THREE DECK



DRIVE UNIT

FIG. 1 VIBRATION SCREEN WITHOUT DUST COVER AND CHUTE

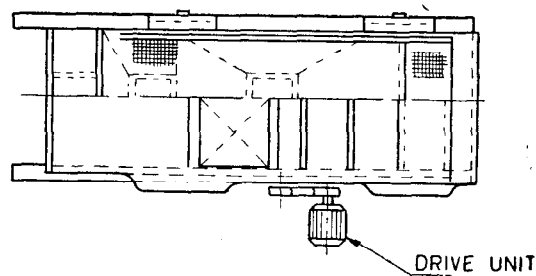
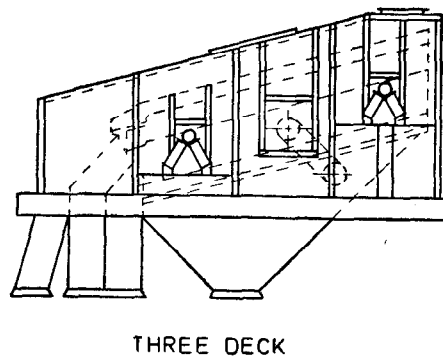
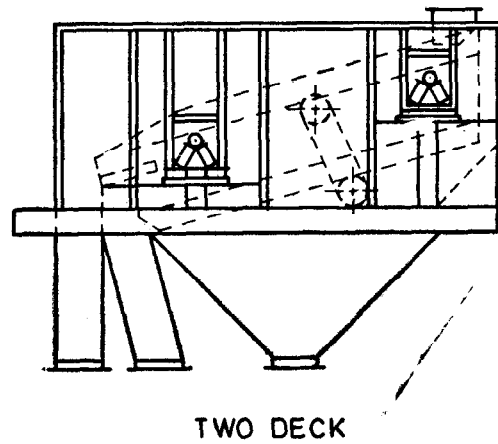
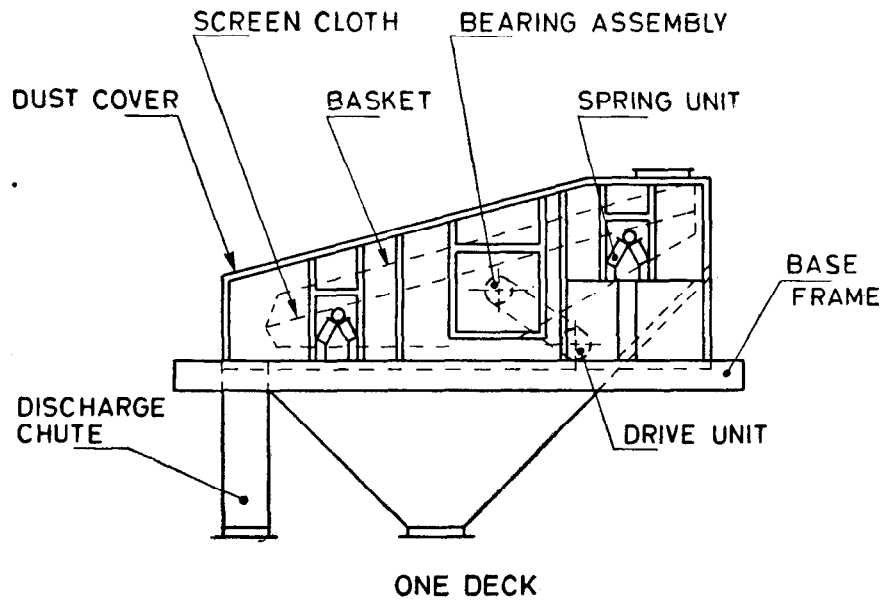


FIG. 2 VIBRATION SCREEN WITH DUST COVER AND DISCHARGE CHUTE

3.6.2 Grizzly scalper — The screens with comparatively large opening. The screens are used where percentage of undersize particles are less.

3.6.2.1 Vibrating type — This is similar to vibrating screens.

3.6.2.2 Roller grizzle — Material rolls over the rollers which are rotated along its axis.

3.7 Basket Mounting

3.7.1 V-spring — Supported on base frame.

3.7.2 Vertical spring — Supported on base frame.

3.7.3 Vertical spring — Suspended from top support.

3.8 Screen Inclination

3.8.1 Horizontal type — Screen almost horizontal with downslope 0 to 5°.

3.8.2 Inclined type — Screen downslope shall be decided, based on screening capacity and material characteristics and shall normally be between 15 to 25° from horizontal.

4. Principle of Operation — The vibrations are given to basket/live frame by unbalanced masses. The vibration may be of either circular motion or straight motion. Material is fed from feed end on vibrating basket/live frame. Undersize material flows down the deck and oversize material flows ahead on separate zone. The zone may be divided in different chutes connected down below.

5. Construction — Vibrating screens/grizzly shall consist mainly of :

- a) vibrating basket/live frame,
- b) vibrating unit,
- c) screen cloth, or
perforated plate/grizzly bars,
- d) supporting frame or dust cover, and
- e) drive unit.

5.1 Vibrating Basket/Live Frame — It shall be of bolted or welded construction. It shall consist of two side plates and cross members. Cross members shall either be of standard rolled section or frame section with adequate strength.

5.2 Vibrator Unit

5.2.1 Circular motion vibration — It shall consist of concentric/eccentric shaft mounting in spherical/cylindrical roller bearing. The bearing shall be of vibration duty with special clearance. Unbalanced masses are provided at either end of bearings. Adjustment arrangement for unbalanced masses shall be provided. Bearing unit shall be properly lubricated by grease/oil. Circular motion vibration shall normally be applied to inclined screen.

5.2.2 Straight line motion vibration — It shall consist of two shafts with unbalanced masses rotating in opposite directions and mounted so that the line of action between them passes through the centre of gravity of screen assembly resulting in near straightline or little elliptical motion at an angle of approximately 45° with screen surface in the direction of material flow. Vibrating duty bearing shall be used. Bearing unit shall be properly lubricated, either by oil or grease. Unbalanced mass direction shall be adjusted to give required angle of throw in straight line direction. Straight line motion vibration shall normally be applied to horizontal screen.

5.3 Bearing Arrangement — The circular motion screens may have the following bearing arrangement.

5.3.1 Two-bearing system — The vibrator unit shall consist of an eccentric shaft mounted on two bearings each bearing being supported by one of the side plates.

5.3.2 Four-bearing system — The vibrator unit shall consist of an eccentric shaft mounted on the the outboard bearings attached to the stationary main frame in addition to the bearing arrangement as in case of two-bearing system. The side plate bearings being eccentric to the outboard bearings, the eccentric shaft serves as both a crank arm and a counterbalance and produces positive action.

5.4 Mounting of Vibrator Unit — The vibrator unit shall be attached to the side plates through or near the centre of gravity of the screen to generate uniform vibration throughout the entire screen.

5.5 Screen Cloth — Screen cloth shall be fitted with edge binding plate in case of smaller opening and thin wire size. Large opening and bigger size with cloth are fitted with straight plates only. Cloth may be provided with middle fixing arrangement in case of bigger size cloth.

5.6 Base Frame, Dust Cover and Feed Box (Optional) — Sturdy base frame may be provided to support vibrating units. The natural frequency of base frame shall not be near or equal to the operating frequency of screen. This shall preferably be higher than the screen operating frequency. Dust cover may be provided with inspection and maintenance door for spare part replacement. Dust hood vent may be provided for connecting to the dust collection system. Hinge door may be provided for spring unit and unbalanced mass inspection. Width of dust cover may be selected such that proper clearance is available during vibrating motion. Necessary feed box may be provided in such a way that the material is fed to the screen across its entire width in the direction of flow.

5.7 Drive Unit — V-belt drive shall normally be provided for all types of vibrating screen drive. However, drive motor with universal coupling may also be used for drive. Drive motor may be provided with pivoted motor/sliding base for proper tensioning as well as to take up V-belt stretch due to start/stop bounces.

6. Material of Construction

6.1 Shaft — The material of the shaft shall be 45C8 of IS : 1570 (Part 2) - 1979 'Schedules for wrought steels for general engineering purposes: Part 2 Carbon steels (unalloyed steels) (first revision)' equivalent or as per designer's recommendation depending upon duty condition.

6.2 Bearing Housing — Cast iron conforming to IS : 210-1978 'Specification for grey iron castings (third revision)' or cast steel conforming to IS : 1030 - 1982 'Specification for carbon steel castings for general engineering purposes (third revision)' or fabricated type depending upon designer's recommendation.

6.3 Side Plate — St42S conforming to IS : 226-1975 'Structural steel (standard quality) (fifth revision)' or flow alloy steel or boiler quality conforming to IS : 200-1969 'Method for determination of copper number of cotton textile material (first revision)' or low alloy steel.

6.4 Pulleys/Sheave — Cast iron conforming to Gr 20 of IS : 210-1978 or fabricated.

6.5 Screen Cloth — Screen cloth 0.5 percent carbon steel (high carbon steel) or purchaser's requirements depending upon duty condition.

6.6 Hardware — High tensile hardware shall be used for connecting the live frame and cross members.

6.7 Dust Cover/Base Frame (Optional) — St42S of IS : 226-1975.

7. General Requirements

7.1 Safety Requirement — The design of the screen shall minimize hazards to the operator. The pulleys, belts and unbalanced mass which are rotating at high speed shall be well protected with a guard. The screen shall be provided with dust covers for dust containment and/or dust extraction. The screen may be supplied with a screen base frame.

7.2 Maintenance Accessibility — The design of the vibrating screen shall provide accessibility to all component sub-assemblies and parts for maintenance and repairs.

7.3 Lubrication — Lubrication means shall be provided for the bearings. All lubricated nipples should be located at approachable distances. The lubrications may be with grease arrangement or oil type. Lubrication shall be selected as per duty condition.

7.4 Designation — The designations of vibrating screens shall include the following:

- a) Horizontal or inclined screens,
- b) Grading or scalping or dewaterizing,
- c) Width and length,
- d) number of decks provided,
- e) Dust cover or base frame, and
- f) Type of vibration.

7.5 Supply — The manufacturer shall supply certificate to the purchaser for main components. The supplier shall give the certificate of the test run items to be covered under this certificate as given in Appendix A.

A P P E N D I X A

(Clause 7.5)

INFORMATION TO BE GIVEN IN THE CERTIFICATE BY THE MANUFACTURER TO THE PURCHASER AT THE TIME OF SUPPLYING THE MACHINE

A-1. The inspection report shall state that the each part of the mechanical vibrating screen has been inspected before assembly to ensure that it is free-from visible defect in casting, machining, etc. The report shall include overall dimensions and specifications as per order.

A-2. Test Run — Test run report shall include the following:

- a) Number of hours the equipment has been run continuously under no load after completion of assembly.
- b) In the test run, the following points shall be observed:
 - 1) Bearing temperature,
 - 2) Amplitude of the vibrations,
 - 3) If the construction of the machine is satisfactory, and
 - 4) If the lubrication condition is satisfactory.

E X P L A N A T O R Y N O T E

Mechanical vibrating screens are generally used for screening the material of various grain sizes. This standard covers the nomenclature, classification, details of construction, recommended material of construction and safety requirements for mechanical vibrating screens for use in nonhazardous areas.